

AMENDMENTS TO THE CLAIMS

1. (Currently Amended) An electrochemical deposition chamber for depositing material onto microfeature workpieces, the chamber comprising:
 - a processing unit including a first flow system configured to convey a flow of a first processing fluid to a microfeature workpiece;
 - a barrier unit detachably mounted to the processing unit such that the barrier unit is below the processing unit;
 - an electrode unit releasably coupled to the ~~processing~~ barrier unit such that the electrode unit is below the barrier unit and spaced apart from the processing unit, the electrode unit including an electrode and a second flow system configured to convey a flow of a second processing fluid at least proximate to the electrode; and
 - a nonporous barrier ~~between the processing unit and the electrode~~ at the barrier unit to separate the first and second processing fluids, the nonporous barrier being a material that allows either cations or anions to pass through the barrier between the first and second processing fluids.
2. (Withdrawn) The chamber of claim 1 wherein the nonporous barrier is an anion-selective exchange barrier that inhibits cations from passing between the first and second processing fluids.
3. (Original) The chamber of claim 1 wherein the nonporous barrier is a cation-selective ion exchange barrier that inhibits anions from passing between the first and second processing fluids.
4. (Original) The chamber of claim 1 wherein the nonporous barrier is flexible.

5. (Original) The chamber of claim 1 wherein the nonporous barrier separates the flow of the first processing fluid from the flow of the second processing fluid.

6. (Original) The chamber of claim 1 wherein the nonporous barrier allows electrical current to pass therethrough in the presence of an electrolyte.

7. (Original) The chamber of claim 1, further comprising:
the first processing fluid, wherein the first processing fluid includes a catholyte; and
the second processing fluid, wherein the second processing fluid includes an anolyte.

8. (Original) The chamber of claim 1, further comprising:
the first processing fluid, wherein the first processing fluid has a concentration of between approximately 10 g/l and approximately 200 g/l of acid; and
the second processing fluid, wherein the second processing fluid has a concentration of between approximately 0.1 g/l and approximately 200 g/l of acid.

9. (Original) The chamber of claim 8 wherein the second processing fluid has a concentration of between approximately 0.1 g/l and approximately 1.0 g/l of acid.

10. (Original) The chamber of claim 1, further comprising:
the first processing fluid, wherein the first processing fluid has a first concentration of acid; and
the second processing fluid, wherein the second processing fluid has a second concentration of acid, the ratio of the first concentration to the second concentration being between approximately 1:1 and approximately 20,000:1.

11. (Original) The chamber of claim 1 wherein the electrode unit further comprises a plurality of electrodes.

12. (Original) The chamber of claim 1 wherein:
the electrode is a first electrode;
the electrode unit further comprises a second electrode; and
the chamber further comprises a dielectric divider between the first electrode and the second electrode.

13. (Original) The chamber of claim 1, further comprising a field shaping module to shape an electrical field in the first processing fluid induced by the electrode.

14. (Original) The chamber of claim 1 wherein the nonporous barrier is canted relative to the processing unit to vent gas from the second processing fluid.

15. (Original) The chamber of claim 1, further comprising a barrier unit coupled to the processing and electrode units, the barrier unit including the nonporous barrier.

16. (Original) The chamber of claim 1 wherein:
the nonporous barrier includes a first side and a second side opposite the first side;
the first flow system is configured to flow the first processing fluid at least proximate to the first side of the nonporous barrier; and
the second flow system is configured to flow the second processing fluid at least proximate to the second side of the nonporous barrier.

17. (Original) The chamber of claim 1 wherein the electrode comprises a pure copper electrode.

18. (Original) The chamber of claim 1 wherein the electrode comprises a copper-phosphorous electrode.

19. (Currently Amended) An electrochemical deposition chamber for depositing material onto microfeature workpieces, the chamber comprising:

a head assembly including a workpiece holder configured to position a microfeature workpiece at a processing site and a plurality of electrical contacts arranged to provide electrical current to a layer on the workpiece; and

a vessel including a processing unit for carrying one of a catholyte and an anolyte proximate to the workpiece, an electrode unit having ~~an electrode~~ a plurality of electrodes and an upper portion canted at an angle relative to the processing unit, and the electrode unit being configured for carrying to carry the other of the catholyte and the anolyte at least proximate to the electrode, and the vessel further including a semipermeable barrier between the processing unit and the electrode unit, wherein the semipermeable barrier selectively inhibits one of anions and cations from passing between the catholyte and the anolyte and the semipermeable barrier is canted at the angle of the upper portion of the electrode unit.

20. (Original) The chamber of claim 19 wherein the semipermeable barrier is either a cation-selective ion exchange barrier or an anion-selective ion exchange barrier.

21. (Original) The chamber of claim 19 wherein the semipermeable barrier separates a flow of the catholyte from a flow of the anolyte.

22. (Currently Amended) The chamber of claim 19, further comprising a barrier unit coupled to a lower portion of the processing unit and an upper portion of the electrode units unit, the barrier unit having a lower portion canted at the angle of the upper portion of the electrode unit, and the barrier unit including the semipermeable barrier.

23. (Currently Amended) A reactor for wet chemical processing of microfeature workpieces, the reactor comprising:

- a processing unit for providing a first processing fluid to a microfeature workpiece;
- an electrode unit including an electrode and being positioned below the processing unit;
- a barrier unit ~~between~~ mounted to a lower portion of the processing unit and an upper portion of the electrode unit, the barrier unit including either a semipermeable cation-selective ion exchange barrier or a semipermeable anion-selective ion exchange barrier, and the barrier being releasably attached to the upper portion of the electrode unit by a quick-release mechanism having a latch;
- a first flow system for carrying the first processing fluid, the first flow system including a first portion in the processing unit and a second portion in the barrier unit in fluid communication with the first portion in the processing unit; and
- a second flow system for carrying a second processing fluid at least proximate to the electrode, the second flow system including a first portion in the electrode unit and a second portion in the barrier unit in fluid communication with the first portion in the electrode unit, wherein the ion exchange barrier separates the first processing fluid in the first flow system from the second processing fluid in the second flow system.

24. (Currently Amended) A system ~~chamber~~ for wet chemical processing of microfeature workpieces, the chamber comprising:

- a first processing fluid having a concentration of between approximately 10 g/l and approximately 200 g/l of acid;
- a processing unit carrying the first processing fluid and being configured to provide the first processing fluid to a microfeature workpiece;

a second processing fluid having a concentration of between approximately 0.1 g/l and approximately 1.0 g/l of acid;
an electrode unit carrying the second processing fluid and an electrode proximate to the second processing fluid; and
a semipermeable barrier between the processing unit and the electrode unit to separate the first and second processing fluids.

25. (Currently Amended) The system ~~chamber~~ of claim 24 wherein the semipermeable barrier inhibits either cations or anions from passing between the first and second processing fluids.

26. (Currently Amended) The system ~~chamber~~ of claim 24 wherein the first and second processing fluids each have a concentration of between approximately 10 g/l and approximately 50 g/l of copper.

27. (Currently Amended) A system ~~chamber~~ for wet chemical processing of microfeature workpieces, the chamber comprising:
a first processing fluid having a first concentration of acid;
a processing unit carrying the first processing fluid and being configured to provide the first processing fluid to a microfeature workpiece;
a second processing fluid having a second concentration of acid, the ratio of the first concentration to the second concentration being between approximately 10:1 and approximately 20,000:1;
an electrode unit carrying the second processing fluid and an electrode proximate to the second processing fluid; and
a nonporous barrier between the processing unit and the electrode unit to separate the first and second processing fluids.

28. (Currently Amended) The system chamber of claim 27 wherein the nonporous barrier inhibits anions from passing between the first and second processing fluids.

29. (Currently Amended) The system chamber of claim 27 wherein the first and second processing fluids each have a concentration of between approximately 10 g/l and approximately 50 g/l of copper.

30. (Original) A system for wet chemical processing of microfeature workpieces, the system comprising:

- a processing unit for providing a first electrolyte to a microfeature workpiece;
- a first reservoir in fluid communication with the processing unit, the first reservoir and the processing unit being configured to carry a first volume of the first electrolyte;
- an electrode unit for carrying a second electrolyte and an electrode proximate to the second electrolyte;
- a second reservoir in fluid communication with the electrode unit, the second reservoir and the electrode unit being configured to carry a second volume of the second electrolyte, the first volume of the first electrolyte being at least twice the second volume of the second electrolyte; and
- a semipermeable barrier between the processing unit and the electrode unit to separate the second electrolyte and the first electrolyte while permitting ions to pass between the second electrolyte and the first electrolyte.

31. (Original) The system of claim 30 wherein the ratio of the first volume of the first electrolyte to the second volume of the second electrolyte is between approximately 1.5:1 and approximately 10:1.

32. (Original) The system of claim 30, further comprising:
the first electrolyte, wherein the first electrolyte has a concentration of between
approximately 10 g/l and approximately 50 g/l of copper; and
the second electrolyte, wherein the second electrolyte has a concentration of
between approximately 10 g/l and approximately 50 g/l of copper.

33. (Original) The system of claim 30, further comprising:
the first electrolyte, wherein the first electrolyte has a concentration of between
approximately 10 g/l and approximately 200 g/l of acid; and
the second electrolyte, wherein the second electrolyte has a concentration of
between approximately 0.1 g/l and approximately 1.0 g/l of acid.

34-48. (Cancelled)